2. CHAPTER TWO: METEOROLOGICAL, HYDROLOGICAL AND CLIMATE SERVICES TO SUPPORT DISASTER RISK REDUCTION AND EARLY WARNING SYSTEMS IN ALBANIA

Albania is prone to several natural hazards like floods, drought, heavy rainfall or snowfall, wind storms, heat waves, landslides, avalanches, forest fires, airborne sand from deserts and some epidemics which are directly or indirectly related to hydrology, meteorology and weather conditions. Every year Albania faces some or several natural hazards causing human and economic losses.

This chapter presents all the findings related to the assessment of the DRR institutional framework in Albania and the technical capacities of the NMHS of Albania (Institute of Environment, Water and Energy, IEWE) to support Disaster Risk Reduction. It highlights that:

- The Albanian hydro-meteorological sector is more or less disordered and does not have the technical, human and financial resources to meet the needs for hydro-meteorological services in order to provide expected information and products to the Government, the socio-economic communities, to protection of human life, and to improve human and environmental safety. It neither has the capability to properly fill the international commitments of producing hydro-meteorological data to promote regional and global cooperation in production of better hydro-meteorological modelling and services to promote the human safety and well-being;
- In this regard, there is a need to establish and invest in fully operational 24/7 hydro-meteorological services (technical and human resources) to support risk assessment and early warning systems and promote operational monitoring, warning, forecasting and mapping of meteorological, hydrological and climate-related hazards. It is critical to perform comparative analysis of the existing institutional and legislative arrangements for hydrometeorological services, upgrade and modernize hydro-meteorological observation networks, data management and forecasting systems and provide sustainable organizational, human and technical resources to maintain and operate them. It is also necessary to strengthen the early warning capacity with a multi-hazard approach and enhanced cooperation with the Ministry of Interior, General Directorate of Civil Emergencies and other key stakeholders and the National Civil Emergencies Plan, to include contributions by the hydro-meteorological services;
- Development of Risk Assessment, MHEWS and other capacities to support national risk management could also benefit from regional coordination and cooperation, leveraging expertise, capacities, resources and information across the region among IPA beneficiaries and with various regional centers in Europe.

2.1. Albania's vulnerability to hydrometeorological hazards

2.1.1. General overview of country's economic sectors

Albania, a formerly closed, centrally planned state, is making the difficult transition to a more modern open-market economy. Although the country is rich in natural resources, the economy is mainly bolstered by emigrant annual remittances, services, and the agricultural sector. Macroeconomic growth averaged around 6% between 2004 and 2008, but declined to about 3% in 2009-10. Inflation is low and stable. The agricultural sector, which accounts for over half of employment but only about 21% of GDP, is limited primarily to small family operations and subsistence farming because of lack of modern equipment, unclear property rights, and the prevalence of small, inefficient plots of land. The contribution of industry to the GDP is estimated at 20% and services accounts for about 60%.

2.1.2. Natural hazards in Albania

Geographical position of Albania as a Mediterranean country makes it a disaster prone country which is exposed to several natural hazards like flood, drought, heavy rainfall or snowfall, wind storms, heat waves, landslides, avalanches, forest fires, airborne sand from deserts and some epidemics, all being directly or indirectly related to hydrology, meteorology and weather conditions.

The river system poses the highest risk of flooding to the country. Floods are generally of pluvial origin and occur during the period November-March when the country receives about 80-85% of its annual precipitation. More recent flood records indicate that major flooding has occurred in all of the principal watersheds. Historically, the floods of November 1962 and January 1963 are considered to be the largest. In total about 70,000 hectares of agricultural land was flooded causing substantial economic damage, as well as major cities. The most recent flooding affected Albania in September 2002. It was caused by the River Erzeni and its tributaries and inundated the cities of Lezhe and Berat and their surrounding villages as well as other rural areas and agricultural land along the riverbanks of the above rivers. During the last weeks of 2009 and the first days of 2010 most parts of Albania experienced continuous heavy rainfall and periodic snow melt in mountain areas. This phenomenon occurred particularly in the north and northwest of the country. This resulted in the creation of a critical situation at the River Drini hydro-power plants and water-reservoirs as well as downstream. As a consequence of the above situation a large area of the Shkodra region was inundated from the 3 - 10 January 2010. 11,400 hectares, including 2,649 houses, was either under or surrounded by flood water. Eight communes/administrative units were heavily affected by this situation, including rural and national infrastructure, water pipelines, etc.

Table 1: Impacts of major floods in Albania

Event	Location	Impacts
Flood of November 1962 – January 1963	Part of cities of Shkodra, Berat, Lezhe and others	70000 ha agricultural land flooded Huge damages in flood infrastructure, road infrastructure, livestock loss, no victims
Flood of December 1970 – January 1971	Vjosa river area	14000 ha land flooded Damages and destruction of embankment, irrigation channels, bridges, pumping stations
Flood of September – October 2002	Part of cities of Lezha, Shkodra, Gjirokastra, Berat and others (11 districts in total)	33000 ha flooded Considerable loss in agriculture, damages in houses, businesses, roads, bridges, pumping stations, dams, electric stations, and other infrastructure, up to 9727 people evacuated, $17.5 million evaluated as total loss cost
Flood of December 2009 – January 2010	Buna River and Shkodra lake	10,500 ha agricultural land flooded Sustained damage in the nearby water supply, roads, bridges, and more than 2500 House Buildings and 5,300 residents evacuated

Snow precipitation is characteristic of the inland mountainous regions in the north and north-east and the centre and south. In mountainous regions snowfall usually begins in November and lasts until late March. High snowfall and frequent avalanches caused substantial damage in the winters of 1933/34, 1940/41, 1953/54, 1963/64 and 1972/73. The avalanches of Bater (Mati District) in March 1965 and of Feken (Mali me Gropa) of March 1981 were the most dramatic occurrences. The winter of 1985 was an exceptional one. In the period January-February, as a result of intense snowfall, large numbers of avalanches were triggered in the districts of Tropoje, Kukes, Diber, Puke, Shkoder and Mati. In total 68 people were killed, 135 injured and 1,604 houses were destroyed.

Land instability in Albania primarily occurs after massive torrential rain or snowfall. Various modes of landslide (rock falls, topples or torrent deposits) are often recorded along disturbed slopes along national and regional transportation routes, water irrigation and other surface channels and places of other engineering works. Last year in Albania eight serious landslides occurred in populated rural areas, affecting a large number of families, houses, infrastructure, etc.

During the last two decades the occurrence of forest fires in Albania has increased in number and also in the size of the area affected. The forests of Albania are especially prone to fire at the end of spring and during unusually warm and dry summers. The main causes of fires are primarily of an anthropogenic nature (human negligence, pasture burning and similar and to a lesser extent as a result of arson) and natural (lightning) character. Most damage occurs in the coniferous forests. In the summer of 2007 Albania experienced an extended forest fire, which affected 7 out of 12 qarks: 5 qarks declared an Emergency Situation for Natural Disasters and the ad-hoc Inter-ministerial Committee for Emergency Situations was established. The large area burned caused relatively high economic losses, but fortunately no one was killed.

Since the 1960s, the mean intensity, length and number of heat waves across the eastern Mediterranean have increased, particularly the accumulation of short (less than 6 days) but more intense heat wave events compared with previous decades. Albania is exposed to these increases and at least three events leading to mortality and economic loss have been recorded since 1980.

The severity of extreme events like drought, heat waves, forest fires and flooding has intensified over the last few decades and as revealed in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, this trend is expected to accelerate in the future as a result of climate change, leading, together with changes in land-use patterns and increased human settlements in areas that are prone to disasters, to increased hydrometeorological and climate-related risks in the coming years.

Albania suffers also frequently from earthquakes of different magnitudes.

2.1.3. Sectoral analysis of the vulnerability to hydrometeorological hazards

In Albania, key sectors of the economy are highly vulnerable to hydrometeorological hazards and climate change, and in particular the water sector and the agriculture. Since much of Albania's economic activity is dependent on the utilization of water resources, Albania's economy results to be particularly vulnerable to hydrometeorological conditions and climate variability and change. The hydrographic basin of Albania covers 43,305 km^2, of which 28,748 km^2 lie within its boundaries. The rest (i.e. 33 per cent) is in Greece, the Former Yugoslav Republic of Macedonia and Yugoslavia, so Albania shares upstream and downstream water resources with its neighbours. Thus, for Albania it is critical to build strong partnerships with those countries for water management including flood protection. Seven main rivers run from east to west in Albania. Most of the rivers discharge into the Adriatic (95%), while only 5% discharge into Ionian Sea.

Over 90% of energy production in Albania comes from hydropower plants, and agriculture is critically dependent on irrigation. However, the inadequate and poorly maintained infrastructure in each of the water-using sectors and the absence of institutional coordination has resulted in the

lack of water supplies becoming a key constraint to many economic activities and to satisfying basic social needs.

With 58% of total labor and 19% of GDP, the agricultural sector continues to be one of the most important sectors of the Albanian economy. About 56% of the population lives in rural areas, where agriculture is the main activity. Agricultural production has increased at an average of 3% between 2002 and 2006, which is a lower rate than for the economy as a whole. The increase in yields has been substantial for grapes, potatoes, milk from cattle and goats, eggs, fruits and fodder. Fruit production (including grapes) has increased by 70% between 2000 and 2008, animal production by 21% and arable crops by 10%. Within arable crops wheat areas have decreased markedly. Vegetables production has increased notably, particularly in greenhouses.

Agriculture is a climate sensitive sector. With the majority of the rural population being poor and dependent on agriculture, rural communities are vulnerable and at risk from any changes that occur as a result of climate change. Present projections including increased temperatures, decreased precipitation and an increase in the number of extreme events pose a serious risk to agriculture production, water availability, food security and economic growth for rural livelihoods in Albania. Areas that are already under marginal rain-fed production will be at increasing risk, whilst communities in high rainfall areas will have more adaptation options to buffer their production systems against projected changes in climate. The irrigated agriculture sector will need more water to maintain production, although significant opportunity exists for improvements in system and on-farm water use.

2.2. Institutional Framework of Disaster Risk Reduction in Albania

2.2.1. Legal framework

In Albania DRR organization is defined by the National Plan for Civil Emergencies, which was adopted by the Council of Ministers and is derived directly from the Law on “Civil Emergencies” (Law No. 8756 dated 26.03.2001). The law “On Civil Emergencies” defines the main tasks and duties of the Directorate General for Civil Emergencies.

The Government of Albania is in the process of developing the National Strategy for Development and Integration. This strategy incorporates all sectoral strategies, including one for DRR. The Albanian strategy for DRR incorporates integrated environmental risk reduction policies into development plans at the national, qark and communal/municipal levels.

At the regional and communal level a designated office has been established to deal mainly with emergency management. All activities at these levels are based on the Law on Civil Emergencies, the Law on Fire Protection and the Law on Local Government. Structures at the communal level are coordinated and conducted by central government structures, but they maintain a level of dependency on communal authorities. Such a conduction and dependency is due to the definition of the Law on Local Government that civil emergency is a dual governmental function: central and local.

Besides the Law on Civil Emergencies and the decrees of the Council of Ministers that derive from this Law, there are a other laws and legal provisions that deal with environmental protection, environmental impact assessments, the protection and development of forests and pasture, agriculture and rural area development, the safety of dams and dykes, public health protection, urban planning and construction among others that create a more complete legal framework for DRR. In any event, a new law on civil emergencies is needed to provide a more organic, overall coordinative and preventive approach to DRR; in actual fact a new draft law is in place.

The Law on Water Resources (No. 8093 of 1996) (Water Law) is the primary legislation governing the country’s inland, maritime, surface, and groundwater and is intended to ensure the protection, development, and sustainable use of the country’s water and provide for its proper distribution. The

Water Law addresses water rights, water use, and governance of water resources. A new law on water management has been drafted but has not yet been approved.

The Law on Irrigation and Drainage (No. 8518 of 1999) established the responsibilities of the Ministry of Agriculture, Food and Consumer Protection concerning floods protection.

The relevant line ministries, such as the Ministry of Environment, Forests and Water Administration; the Ministry of Agriculture, Food and Consumer Protection; the Ministry of Health, the Ministry of Economy, Trade and Energy, and other ministries have designated offices for DRR and focal points officers. Such ministries are developing sectoral strategies with a DRR approach. These strategies and respective policies emphasize preventive targets against disasters.

The DRR National Policy Dialogue in Albania (2010) pointed out the commitment of Albania Government for the establishment of a National Platform for Disaster Risk Reduction. The Platform should strengthen the profile of DRR and to ensure that debate across all levels of government, technical agencies such as the hydro-meteorological services, civil society, NGOs and the private sector is ongoing and contributes actively to policy-making and planning. The National Platform will allow for the engagement of all major practitioners and technical specialists as well as representatives of communities and those affected. It will also promote awareness and coordination among the relevant sectors, and ultimately support the linking of such awareness and coordination to national planning, budgeting and implementation of DRR activities.

2.2.2. Institutional framework

At the national level the coordination mechanism for most aspects related to DRR is led by the Directorate General for Civil Emergencies of the Ministry of Interior. Even if this structure is still organized on a disaster-response mode, it is becoming increasingly active in aspects related to the coordination of recovery from disasters and in stimulating the incorporation of DRR principles and concepts into development planning. Meanwhile, the Directorate coordinates training activities for DRR, the legal provisions and DRR requirements for sectoral policies and plans. In parallel, each line ministry is responsible for the coordination of DRR aspects pertaining to their area of responsibility, thus reflecting DRR needs through development plans and improving capacities for DRR. The relevant national agencies involved in DRR for hydrometeorological hazards are:

- The Directorate General for Civil Emergencies, Ministry of Interior;
- The Institute of Environment, Water and Energy, Ministry of Environment, Forests and Water Administration;
- The Department of Land and Water Management, Ministry of Agriculture, Food and Consumer Protection;
- The Ministry of Environment, Forests and Water Administration.

2.2.2.1. Directorate General for Civil Emergencies

According to the law “On Civil Emergencies”, the main tasks and duties of the Directorate General for Civil Emergencies are policy making for emergency management and prevention and the implementation of overall civil emergency issues. This includes the implementation of relevant emergency response and recovery planning, coordination of all actors at the central (designated offices, or focal point officers, in the line ministries) and local level, management of the system, following education and training programmes, public awareness on natural/man-made disaster concerns, conducting relevant research, implementation of national/international agreements in the field between partners and the main actors, reporting periodically to the Government on the emergency management situation, hosting the technical secretariat of the ad-hoc Emergency Inter-ministerial Committee (when it is convened in the event of an emergency situation), dealing with emergency needs and damage assessments, management of respective resources/funds and monitoring of the emergency management database. A National Plan for Emergency Management has been produced in 2004 and it is expected to be updated.

2.2.2.2. Institute of Environment, Water and Energy

Currently official National Meteorological and Hydrological Service in Albania is represented by three different governmental Institutions: (i) the Institute of Environment, Water and Energy (IEWE), (ii) the Military Meteorological Service (MMS) under Albanian Ministry of Defense and, (iii) the Meteorological Service under National Air Traffic Agency (MSNATA). Besides them, there is also one private company performing weather forecast.

According to Government Decision Nr. 560 dt.22.08.2007 in the framework of the reform in Science in Albania, the Institute of Energy, Water and Environment (IEWE) was created based on the former Institute of Hydrometeorology and Hydraulic Research Center. This institute is under Polytechnic University of Tirana (Ministry of Education and Science). According to Civil Emergency Law nr° 8756, the IEWE provides information of curr ent meteorological and hydrological situation and weather forecasting, sending it to the Directorate General for Civil Emergencies. The IEWE is responsible to manage the national meteorological and hydrological networks, to provide studies about climate and hydrology, water and air quality in Albania, and to carry out studies about climate change and its impacts. In DRR, the IEWE does not have the mandate to issue warnings for the public but it has the responsibility to produce data from hydrological and meteorological stations, weather forecasts, hydrological forecasts, hydrometeorological warnings and air and water quality information to the authorities at different levels. It also has the responsibility to provide information to the DRR organization at different levels IEWE is also responsible for hazards data collection and post disaster analyses. This information is provided to the Directorate General of Civil Emergencies, which is responsible for flood risk assessment. IEWE is composed of three departments: (i) the Department of Climatology and Environment (ii) the Department of Water Economy, and (iii) the Department of Energy technologies.

The MMS operates its own meteorological observation network and has the mandate to produce public weather services, including weather forecast that are presented on TV. The MMS provides also commercial weather services to customers within different economic sectors of Albania. The Airport Meteorological service has its own observation station. Currently there is very little cooperation between the three meteorological services (IEWE, MMS and MSNATA).

2.2.2.3. Department of Land and Water Management (DLWM)

The Ministry of Agriculture, Food and Consumer Protection (MAFCP) is the principal government body responsible for the irrigation and drainage systems, and flood defense works. The General Directorate of Land & Water and Services within the Ministry of Agriculture, Food and Consumer, according to the Law on Irrigation and Drainage no. 8515, dated July 30, 1999, is responsible for defining institutional arrangements and competencies supporting a national policy in respect of irrigation, drainage and flood protection in Albania.

Within this Directorate, the Department of Land and Water Management (DLWM) has the mission of sustainable and effective management of agricultural land, irrigation system, drainage and protection from flooding. Within this department, the Department of Drainage and Flood Protection is responsible for floods protection and oversees the operation of Drainage Boards operating in the process of maintenance and rehabilitation of drainage infrastructure protection. The Drainage Boards are responsible at local level to operate and maintain the main drainage system and flood defense works within its drainage service area, so as to remove excess water and prevent water logging, the development of salinity and toxicity and to prevent flooding. In fulfilling its primary task, each Drainage Board shall, within its drainage service area routinely inspect, survey, maintain, and repair main drainage systems and flood defense works; prepare an periodically update an emergency flood plan; and maintain sea defenses.

2.2.2.4. Ministry of Environment, Forests and Water Administration (MoEFWA)

The mission of the Ministry of Environment, Forests and Water Administration (MoEFWA) is to draft and propose policies, strategies and action plans for the protection and administration of the environment, forests, waters and fisheries in order to achieve sustainable development, and to

improve the quality of life and enable the country to join the European Union. The accomplishment of this mission is carried out through participation, initiation and coordination of the activities that lead to long-term developments and well being, by protecting the nature and raising the awareness of the public opinion. The MoEFWA may propose measures for the protection and preservation of the environment, forestry and water resources and is responsible for the implementation of water policy and forestry policy. In the last years, the Ministry of Environment, Forestry and Water has been more involved in floods management and protection. But the sharing of roles and duties with DLWM is not very clear.

2.2.3. Operational relationship with Disaster Risk Management and other Technical agencies

Each line ministry is responsible for the coordination of DRR pertaining to its area of responsibility. As there is little consultation with and guidance from the Directorate General for Civil Emergencies, institutionnal linkages and operational relationships with line ministries and technical agencies would need to be reinforced to match the existing legal provisions.

Among the relevant institutions, there is inadequate understanding of and capacity for DRR. Overall coordination is lacking. Albania does not yet have a National DRR Platform that would facilitate the interaction of key development players around the national DRR agenda and serve as an advocate for adopting DRR measures at all levels. DRR is frequently assumed without really being identified or defined. Moreover, many institutions are not adequately involved. For example, the hydro-meteorological sector does not yet participate fully in national and regional DRR through monitoring, analyzing, mapping, warning and forecasting hazards. It should be reorganized, with the objective of making it Public Service according to WMO standards. This can only be realized if adequate human, technical and financial resources are allocated to this sector, so that it can sustain its role towards the community and in different phases of DRR, including studies on impacts of climate change.

Standard Operating Procedures (SOP) and Quality Management Systems (QMS) between the NMHS and the DRM sector have not been developed. In addition, there is a lack of communication and exchange amongst different institutions involved in DRR. Different partners indicate the lack of concrete leadership and coordination from the DGCE. The institutions are not used to exchange, to share needs and capacities to respond to these needs. Quite nobody knows what the other does, if not for personal contacts. The National Platform for DRR could help in this direction.

2.2.4. Roles and responsibilities in flood and drought risk assessment

The Directorate General for Civil Emergencies is responsible of the national “Disaster Risk Assessment” and coordinates sectoral line ministries/institutions that have responsibility for the respective sectoral risk analysis, development strategies and integrated plans. At local level, Prefectures and Municipalities are responsible for their own risk assessment and planning. The DGCE coordinates the interministerial committee in case of disaster and collects from line ministries, from its own local teams and from local authorities all relevant information about the disasters (mainly impact data). Twice a year a synthesis of this information is prepared for the Prime Minister. Twice a year DGCE organizes meetings with the Prefects for planning the Emergency management on the next 6 months. Then the DGCE prepares the national plan for the areas exposed to higher risk. All the geographic analyses and maps supporting the plans are prepared by the Ministry of Defense.

IEWE participates in the National Committee for DRR. Up to now the role of IEWE has been to produce some basic statistics and analyses of extremes and climate variability from the national hydrometeorological data to be used for strategic planning of DRR, but it is not actively included into the planning procedure of the DRR system in the country.

Currently, the DLWM is charged by the Government for the flood protection in Albania, either related to agricultural areas or to urban or natural areas. This responsibility is mainly directed to

flood management and prevention (planning, designing, building, maintaining flood protection infrastructures). DLWM prepared flood risk studies for the dams (agriculture related) in case of dam burst, but not for the rivers. After the floods of 2010, floods hazard maps have been prepared in the framework of the emergency management, by the CIMA Foundation using ground data collected by the Ministry of Agriculture and satellite images. For these inundation many information are available. For the other past floods some hazard and impact data have been collected by the MAFCP. MAFCP receives meteorological and hydrological data from IEWE and moreover collects hydrological data on his own stations and in case of floods can measure water levels in the flooded area.

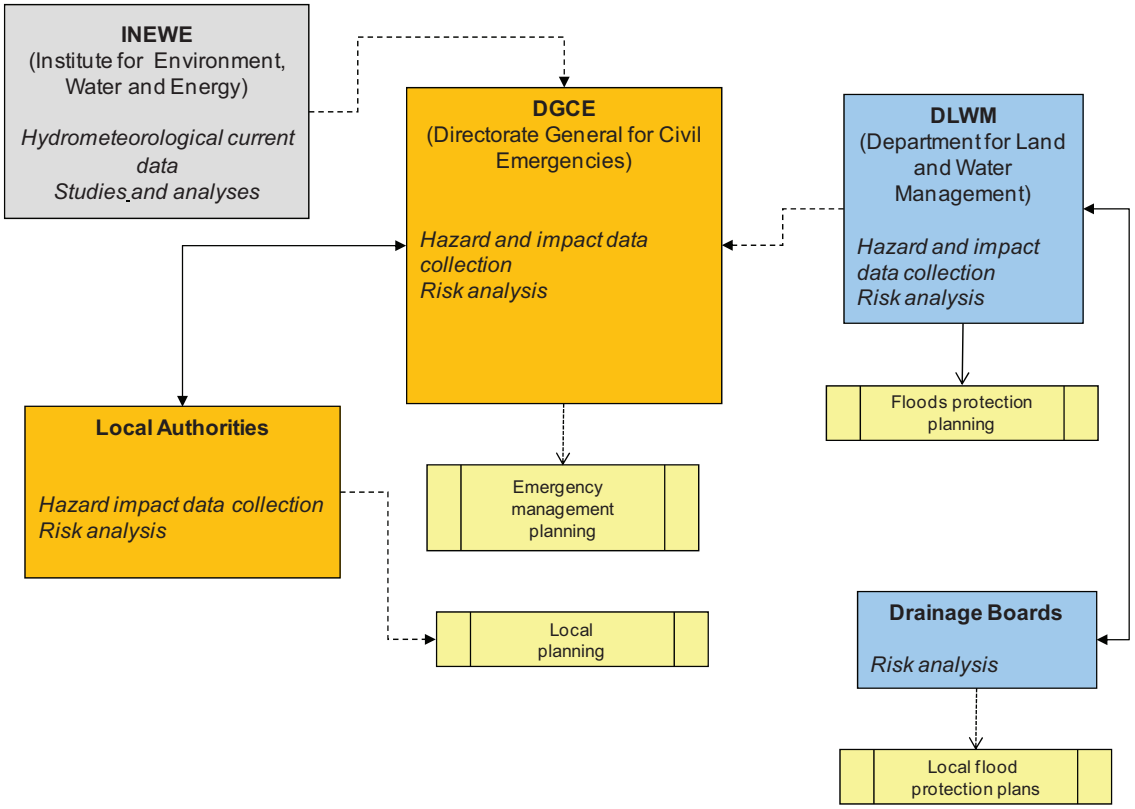

Figure 3. Work flow for floods and drought risk assessment in Albania

In conclusion, risk assessment is not operationally developed in Albania. The DGCE is a coordinating body, is collecting information about floods, but has not technical capacities for perform real risk assessment. However, line ministries have not the capacities to produce hazard maps and even exposure and vulnerability data are very sparse and spotty. The floods and drought risk assessment should be built from the foundation, starting from the legal and institutional framework, with clear mandates, duties and responsibilities with appropriate funding and human resources for the institutions, up to suitable data, tools and technical capacities. The process is actually going on project basis, with different and not always coherent external support, without a clear DRR strategy.

Concerning floods risk assessment, the legal framework is not clear and there are some overlaps and gaps, mostly concerning the share of responsibility between Ministry of Agriculture and Ministry of Environment. Actually the MAFCP is charged of the responsibility of any kind of floods, for management and also for flood protection planning, but in its mandate, only floods affecting agriculture or caused by agriculture related water infrastructures are mentioned. MAFCP has structural gaps hampering its capacity to perform systematically floods risk assessments or even floods hazard mapping. MAFCP does not have technical capacities for data management, spatial analysis and so on. In cases of project-based activities of floods risk analysis, technical activities

are usually given for tenders. At local level the Drainage Boards up to now do not have flood risk assessment capacities, but are more focused on implementing and management of flood protection infrastructures. Even Municipalities do not perform any kind of floods risk assessment, and relevant national institutions whisper that in Albania there is no real spatial planning process at local level.

Concerning drought, it is not even considered as a real issue challenging problem by the Albanian Government, the only drought analysis are performed by the academics and in the framework of R&D projects.

2.2.5. Budget and funding for DRR

Regarding financial resources, the Law on Civil Emergency Services mentions that the State budget is the "primary financial resource for civil emergency planning and crisis management" and that ministries should have an annual budget for civil emergency planning and response within their respective field of activity. No mention is made, however, of the amount or percentage of budget that should be allocated to DRR. The Directorate General for Civil Emergency receives an annual funding of US$ 200,000.

For emergency issues, four types of budgetary provision are in place: (i) the emergency budget of the Ministry of Interior, (ii) the emergency budgets of local government, (iii) reallocated budgets of line ministries and (iv) the Council of Ministers Reserve Fund.

The Law on the State Budget allocates a yearly reserve fund at national and local levels. The Council of Ministers is entitled to use this fund in the event of a civil emergency situation, as well as for disaster reduction measures. In recent years, an inter-institutional action aimed at flood risk reduction has been implemented in the north-west part of Albania (the Lezha region). This increase in investment in the financing of disaster reduction has had positive results in areas such as Lezha, where flooding used to occur frequently but now the level of risk has significantly decreased.

Most of the funds are allocated for disaster preparedness and post-disaster recovery. These budgets are primarily intended for emergency situations, although there are training and development budgets within line ministries that include DRR elements. In overall terms though, the financial means for DRR in Albania are extremely limited at the present time, particularly at the local level.

On 16 May 2008, Albania has become the first country member of the Catastrophe Insurance Fund established as part of the SEE Catastrophic Risk Insurance Facility (CRIF) to receive USD 2.5 million from IBRD. These funds were allocated to cover its capital contribution to the Facility and the costs for conducting a public education campaign on the benefits of catastrophe insurance. The CRIF will offer innovative low-cost catastrophe insurance products for earthquake and flood risk to homeowners and small and medium enterprises (SME), including stand-alone catastrophe insurance coverage for damage to property and stand-alone catastrophe insurance coverage for financial losses sustained by SME due to such concerns as the interruption of business and damage to equipment. However, the national insurance sector is currently not involved and its mobilization is not guaranteed.

2.3. Technical Capacities of Hydrometeorological Services to support Disaster Risk Reduction

2.3.1. Monitoring and observations networks and data exchange

Quality of hazard analyses and global and regional weather forecasting depend strongly on quality and spatial density and representativeness of the observation network. Hydrometeorological observation networks are established not only for national needs but also to be a part of the WMO Global Observation System (GOS) comprising of standardized measurements taken at constant hours using surface observation and monitoring stations, upper air observation, hydrological

measurements and satellite observations. International exchange of data is the core for monitoring and forecasting the weather globally, regionally and nationally. Historical data comprising long time series of accurate and representative measurements are essential for climatological studies, hazards analyses and for monitoring of climate change. Real-time observations are critical for:

- prompt reaction in meteorological, hydrological and air quality emergency situations;
- reduction of vulnerability to the risks caused by meteorological, hydrological and environmental hazards;
- short term forecasts;
- validation of forecasting models;
- improved data assimilation, which will benefit the global, regional, local and mesoscale NWP modelling.

Table 2: Observation stations operated by IEWE

Type of observations stations	2007	2010	2011	GTS	Comments on 2010 network
Atmospheric domain					
Surface synoptic stations (> 8 obs./day)	17	22	30	no	In 2011 only 3 obs/day
Manned stations	1			no	
AWS or AWOS	1	7	10	no	only 1 operational
Cloud-height – automatic	0	0			
Agrometeorological stations	15	15		no	
Maritime/lake stations - manned	NA	2		no	none operational
Maritime/lake stations - automatic	0	0		no	
Ordinary climate station (3 obs./d)	24	110	77	no	
Rainfall station (2 obs./d)	25	15	24	no	
Rainfall station – automatic	0	0			
Meteorological towers	0	0			
Upper air radio sond stations	0	0			
Pilot balloon stations	0	0			
SODAR/RASS	0	0			
Wind profiler stations	0	0			
Lidar	0	0			
Access to AMDAR data					
Weather radars	0	0			
Hale radars	0	0			
Lightning detection stations	0	0			
Lightning detection hub station	0	0			
Satellite MSG ground station	0	0			
Hydrological domain					
Hydrometric stations	92	105		no	7 with automatic water level not operational
Stream gauge station – manual	0	0			
Stream gauge station – automatic	0	0			
Water level post – manual	0	0			
Water level station – automatic	0	0			
Maritime domain					
Buoys					
Buoys with meteorological observations					
Tidal stations	8	2		no	none operational
Tidal stations with met. observations	2	NA		no	
Environmental domain					
Air quality	11	NA		no	
Water quality	48	NA		no	
Nuclear deposition					
Ozone – near surface					
Ozone – upper air					
UV radiation					

The IEWE observation network is described in terms of number of different types of station in table 2. Among the 30 synoptic stations (actually collecting data only 3 times per day), there are ten Automatic Weather Stations (AWS), but the automatic observation system is not working principally due to energy supply problems, batteries damages or data logger problems. Thus data are manually collected and transmitted once per month to IEWE by the observers. At manned main meteorological stations manual observations are made and recordings are taken every three hours. The main station observations are communicated as soon as possible to the organization using different types of communication systems (phone, email, mobile phone, internet). From climate stations, monthly data is sent by post. The national hydrological observation network consists of 105 hydrometric stations of which 7 are equipped with automatic water level measurement systems, all purchased after 1998 and actually not fully operational. Additionally MMS operates 10 manned meteorological stations making 8 observations per day, and the Airport Meteorological Service has its own stations at the airports.

No meteorological or hydrological data is shared by IEWE through the WMO Globalé Telecommunication System (GTS) system, as the connection to the regional hub in Sofia, Bulgaria, does not work. MMS or the aviation data is also not linked to the WMO GTS system. In principle the data sharing protocol meet the WMO protocol.

In principle, all meteorological and hydrological observations and measurements in Albania are made according to WMO recommendations, but due to lack of calibration, maintenance and quality control, the measurements do not meet the WMO standards. Additionally, except the automatic stations, the equipment is obsolete. The number of automatic weather stations is very low compared to EUMETNET countries (and currently only one station is operational), and there are neither upper air observations nor weather radars. The maritime observations have declined further since 2007.

The World Bank Disaster Risk Mitigation and Adaptation Programme, foresees to strengthen the IEWE data collection and management capacities through the procurement of hydrological and meteorological stations, instruments and equipments. In addition, in the framework of a project on renewable energies, 20 AWS have been purchased and wait for being installed. This would be a significant contribution for the development of IEWE.

2.3.2. Hydrometeorological data management systems

Historical hydrometeorological data is critical for hazard analyses and planning and design within various economic sectors. In this regard, hydrometeorological data must be properly quality-ensured and stored in historical user-friendly digital databases.

In Albania, the hydrometeorological data produced by IEWE is stored in the National Hydrometeorological Archive. The time series start from 1951 and are stored in a non-converted ASCII format and for part of it in Excel tables on a Pentium IV computer using Windows with an is 250 Gb disk space. The quality control of the observations is done afterwards, so there is no real-time quality control system available. Back-up system does not correspond to standards used at most of the EU NMHS. The situation of available data is presented in Table 3, even if the real amount of data in the different formats is not precisely known.

Table 3: Available hydrometeorological data in Albania

Period	Hydrometeorological data available
1947-1990	80% of hydrometeorological data are quality controlled and digital in excel
1990-2000	100% of hydrometeorological data are quality controlled but only partially in digital format
2000-2011	Meteorological data are partially quality controlled and only a small amount in digital format Hydrological data are all on paper, water levels partially quality controlled, discharge values partially calculated.

Due to lack of quality control of data, lack of proper data management and lack of proper staff the hydrometeorological data collected is not adequate for scientific analyses and risk assessment.

IEWE disseminates historical data, near-real-time (IEWE has no real-time on-line stations) data and hazard monitoring data to the National Committee for Disaster Reduction and other DRR partners. Historical data is disseminated by hard copy mailing on demand. IEWE disseminates data from some hydrological and meteorological stations to agreed focal points (e,g. Tirana Commune Disaster Management) via SMS, internet, email and phone. Generally data are free of charge for government institutions and charged for private companies.

The World Bank Disaster Risk Mitigation and Adaptation programme, foresees to strengthen the IEWE data management capacities through data rescue, quality control and digitalization of the whole hydrological and meteorological data set, and the establishment of an information system for data storage and management (including receiving real-time data from AWS).

2.3.3. Hazard analysis and mapping to support risk assessment

Actually, there is no national institution that produces floods or drought hazard mapping. At national level, the only public institution producing maps is the Ministry of Defense.

IEWE collects soil moisture, soil temperature, phenological and evapotranspiration data. But this data are on paper and are not used for any analysis. Concerning floods analysis, IEWE calculates the maximum discharge with return periods, flood frequency, maximum water levels analysis in the cases of lakes and sea, 24 hours precipitations, maximum precipitation intensity. IEWE produces statistical analyses on averages, trends, variability and extremes and makes studies of potential impacts. Statistical analyses of meteorological data are used for drought monitoring. Some studies have been done on drought at IEWE, an exemple of which is the study on hydrological drought in the river Vjosa. Concerning meteorological drought, a preliminary study has been done for the characterization of drought prone areas, but it remains as a pilot as time series of data are not available for the whole country. The Standard Precipitation Index (SPI) is used in support of drought monitoring, with support from the South East Europe Drought Management Center (DMC-SEE) based in Slovenia and of which Albania is a Member. Overall, digitized historical data are not available for long time series, long-term analysis cannot be developed. Furthermore, IEWE doesn't use any hydrological model or GIS technology.

IEWE is going to receive in 2011 hardware and the Metview-4 software from ECMWF to promote climate analyses. Metview is an interactive meteorological application, which enables operational and research meteorologists to access, manipulate and visualise meteorological data. The system is based on the ECMWF standards for graphics (Magics) and data access (MARS) but can also access locally stored data. IEWE is also partner of a project financed by the Italian Government after the 2010 inundation and implemented by the CIMA Foundation. This project aims to the implementation of a prediction and prevention system of forest fires and floods (DEWETRA, already operational in Italy for the Italian Civil Protection Department). In this framework, CIMA is developing a hydrological model for all the Albania river basins. This model is supposed to be transferred to IEWE, which will become the system manager. The same project foresees training and capacity building activities. The DEWETRA online system is actually used for viewing the products of Numerical Weather Models: ECWMF and COSMO LAMI 17. The products of the RISICO model for fire risk forecasts are also available within DEWETRA for Albania.

DLWM collects hazard data on floods, like flooded area, water depth, etc. But this data is not organized in a database and has not geographic reference. No geographical data exist about past floods, except for the 1963-64 and 2010 events. Indeed floods hazard maps exist for the West Plains done after the inundations of 1963-64 on a 100-year return period, and for the inundations of 2010. The latter have been made by CIMA Foundation using satellite data and field data collected by the MAFCP. DLWM has some information about floods damages, but such data is not organized in a database.

Some impact data could be retrieved from local governments regarding urban floods.

Concerning hazard information and impacts, reports on the situation are prepared by several institutions and structures. In order to be unified and reflect the relevant information requested. The Ministry of Interior has developed a series of standard assessment tools that are applied in Albania, including (i) First Notification Form (prepared at the Prefect level), (ii) The First Disaster Information Report (prepared by the Joint Assessment Team), (iii) Disaster Situation Report to OCHA, and (iv) Request for Line Ministries in Case of Emergencies.

The Rapid Needs Assessment Reports presented in the Civil Emergency Manual are practical tools to be completed by the respective authorities that help to get immediate information on the level of damage and the needs. The Rapid Needs Assessment of a large-scale civil emergency situation must be undertaken by a Joint Assessment Team. However, prior to this, any possible initial contributions must be made, using the same format, by the local authorities (Qark Civil Emergency officer, Prefect and communal and municipal authorities). In extreme situations it is possible that the initial interventions are made before or during the Rapid Needs Assessment: evacuation, search and rescue. Successive follow up assessments will be made using the same approach, but with greater detail as information becomes available and the situation stabilizes. DGCE receives daily reports from its local teams, local authorities and line ministries. These reports are stored as daily (.doc) files, there is no database of damages or impacts from disasters.

2.3.4. Forecasting

In Albania national weather forecasting are produced by three different organizations. Most visible weather forecasts are produced by the MMS.

IEWE produces general forecast for 24 hours, 3 and 5 days and 10 days outlooks. IEWE`s operational forecasting is based on use of printed analysis and forecast products from international forecasting centers and from the Montenegrin NMHS. The IEWE forecasters do not have access to any real-time data. Lack of national observation data is a severe obstacle especially for short term forecasting. Currently IEWE has only 2 duty forecasters and it does not have capacity to operate 24/7 weather forecasting services. IEWE does not produce special marine forecasts. Currently there is no capacity to download numerical weather prediction model products to be used for national weather forecasts, or to run any numerical weather prediction models. MMS has cooperation with the Italian meteorological service and gets their NWP products to be used for MMS weather forecasting.

No numerical hydrological models, wave models or dispersion models for airborne or waterborne pollutants are in operational use. IEWE produces by contract special forecasts for agriculture and aviation sectors.

2.3.5. Warning products and services

2.3.5.1. Warnings and mandates

The mandate to produce different warnings related to the hydrometeorological phenomena is not clearly defined (Table 4). Currently IEWE does not produce any public warnings. However, IEWE has a governmental role to produce up-dated maps and forecasts to the authorities. Hydrological studies for flood warnings have been done for different basins, but no mathematical model was used, only correlations with rainfall. Flood forecasting is given on the different river basins using the simple relationship between the meteorological forecasts and the water levels. MMS gives occasionally warnings in connection to its daily TV weather forecasts. Warnings to the aviation sector only are produced by the MSNATA.

2.3.5.2. Warning dissemination mechanism

Regarding products and warning dissemination, IEWE disseminates hazard monitoring data, forecasts and early warning to the Head of the National Committee for Disaster Reduction and other partners of DRR. The limited weather warnings produced up to now are disseminated to the public via media. MMS gives warnings in the TV presentations and by disseminating advisories to the media, who then edit their own weather forecasts and warnings. Currently there is no mandate to interrupt TV or radio programs, or to the have a continuous warning stripe on the TV screen in the case of the emergency. Method to send warnings directly as SMSs to mobile phones located at, or going to, site of danger is not in use in Albania.

Sectors like Ministry of Health or NGOs like Red Cross are not on the direct contact list of warnings of hydrological or meteorological hazards.

Albania is not member of the EUMETNET METEOALARM systems.

Table 4: Warnings issued in Albania for natural and technical hazards, based on Annex 2

Hazard	Exists in the country	Warning by	Type
Heavy precipitation	Yes	MMS	III
Flash floods	Yes		
River flooding	Yes		
Hailstorm	Yes		
Thunderstorm or lightning	Yes		
Heavy snow	Yes		
Freezing rain	Yes		
Dense fog	No		
Tornado or cyclone	Yes		
Hard wind	Yes	MMS	III
Storm surge	No		
Coastal flooding	Yes		
Heatwave	Yes		
Cold wave	Yes		
Drought	Yes		
Marine hazard	Yes		
Sandstorm	Yes		
Landslide or mudslide	Yes		
Avalanche	NA		
Airborne hazardous substance	Yes		
Waterborne hazards	Yes		
Hydrometeorological hazards for aviation	Yes	MSNA TA	III
Forest or wildland fire	Yes		
Smoke, dust or haze	Yes		
Earthquakes	Yes		
Tsunamis	Yes		
Volcanic events	No		
Dispersion of insect pests	Yes		
Desert locust storm	No		
Hazard for allergic reactions	Yes		

2.3.6. Climate change analysis

In general the role of IEWE is to monitor the climate, to cooperate with international centers in order to downscale projections produced by global models to local scale and to study the trends, variability and extremes, and furthermore to study the impacts of climate change to different socio-economic sectors in cooperation with the industry. For instance, IEWE produces monthly climatologic maps.

Analyses of impacts of climate change are not considered in different sectors yet. Only few studies on climate change in some regions have been done. Currently the Ministry of Health has tried to prepare a project for analyzing the impacts Meteorological and Climate Indexes on health.

It can be expected that also Albania could significantly benefit from the new South East European Virtual Climate Change Center (SEEVCCC), which was established in 2008 within the Serbian National Hydrometeorological Service.

2.3.7. Information Technology and Telecommunication capacities

Quick reliable communication system is critical for collection of data, data sharing and dissemination of products and warnings. Internet has become a very important tool among advanced NMHS to disseminate information and warnings. Currently IEWE does not have capacity and tools for automated production and dissemination of products and warnings (Table 5).

IEWE does not have access to TV or radio programmes or any web pages to disseminate their weather forecasts or any other products to the public and other users of weather services. Currently there are no communication experts employed by IEWE.

Table 5: Equipment in use for data communication and warnings and other products dissemination

Telecommunication Equipment	To receive data	To send data	To send warnings	To send products
Telephone	X		X	
Mobile Phone	X			
Telefax				
Dedicated Leased Lines				
UHF radio transceiver				
High frequency/Single side band radio				
HF Radio Email				
Aeronautical Fixed Telecommunication Network				
Very Small Aperture Terminal				
Data Collection Platforms used to transmit data from AWSs				
Global Telecommunication system (WMO-GTS)				
Meteosat Second Generation Satellite system				
Other satellite systems				
Internet				
Email	X			
Post/mail	X			
Print media				
TV –national				
TV-commercial				
Radio				
Bulletins	X			
Printed text				X

2.3.8. Human resources

In general, the number of IEWE staff is quite high, but the high number comes from high number of observers, while the share of operational staff (meteorologists, hydrologist, researchers) is very low compared to NMHS in the European Union. The IEWE operational staff (meteorology and hydrology) has good scientific background and knowledge, but there are very limited human resources to produce weather forecasts, to produce critical data for risk analyses of

hydrometeorological extremes and to operate an adequate early warning system. Currently IEWE academic staff is R&D orientated. However, this investment in R&D produces a small impact on the quality and the quantity of hydrometeorological services and products to support DRR. The number of IEWE staff by branch and level of education is presented in Table 6. Since 2007 the number of IEWE forecasters has decreased.

Table 6: Number of IEWE staff by branch and level of education

Branch	Field and education														TOTAL
	Techn-icians	Meteorologist			Hydrologist			Engineer			Physicist, Chemist, Economist			Other	
		BSc	MSc	PhD	BSc	MSc	PhD	BSc	MSc	PhD	BSc	MSc	PhD		
Observation network	225														225
Telecommunication															
Data management	1			2	2			2				2			9
Weather forecasting				2											2
Hydrological forecasting															
NWP															
R & D				2	1	4	5			2			2		14
Weather modification															
IT personnel															
Commercial services															
Accounting															
General administration														7	7
Other															
TOTAL	**226**			**6**	**3**	**4**	**5**	**2**		**2**		**2**	**2**		**257**
Female in % of total	0			40	30	75	20	0		0		0	50		5
Men in % of total	100			60	70	25	80	100		100		100	50		95

2.3.9. International and Regional Cooperation

Successful operation of NMHS is based on international cooperation. Weather forecasts and forecasting of natural hazards are based on products from global and regional scale state-of-the-art numerical weather prediction models, use of satellite data and sharing of data from conventional and modern remote sensing systems. Regional, local and mesoscale numerical weather prediction models are developed by international consortiums, to which membership provides better and more services than to non-members.

EU based hydrometeorological organizations provide most state-of-the-art models, software and tools to be utilized by the member NHMSs. The European NHMSs have globally an unique opportunity to benefit from the state-of-the -art weather forecast modeling, medium-range weather forecast products at 16 km horizontal resolution (in near future at 8 km resolution) including the Extreme Forecast Index (EFI), re-analyzing data to be used e.g. for climatologic studies and the ECMWF super computer resources. The integration into the European hydrometeorological infrastructure is key to developing the capacities of the NHMSs to implement best European practices and to produce improved products and services in support of national economic development and DRR.

European Union research and networking programs create consortiums of excellence, and provides good opportunities to NMHS to network with NMHSs and commercial R&D companies and strengthen their capacities.

Currently the level of international cooperation is hydrometeorology in Albania is very low, especially when compared to EUMETNET NMHSs (Table 7) Active cooperation is related to weather forecasting, as IEWE receives daily NWP products from Montenegro and Serbia, and MMS from Italy. Bilateral cooperation with the Italy also concerns training activities and technical assistance by CIMA Foundation. Regionally, Albania is a participant in the DPPI and is involved in

the ISDR system. IEWE is partner of the DMC-SEE programme and is participating in the DMCSEE project in the frame of EU's transnational cooperation programme.

Albanian hydrometeorological services would benefit significantly from membership in ECMWF, as they could receive NWP model products at 16 km horizontal resolution, which directly could be used with sufficient tools to produce automatically local quasi-site- specific 1-10 day weather forecasts. Furthermore ECMWF data could be used as input data if Albanian weather services were going to run smaller scale NWP model(s) in order to improve spatial accuracy of the forecasts. Presently, the most important elements of DRR in Albania are under development through the World Bank **"**Disaster Risk Mitigation and Adaptation Programme". The overall coordination of this project falls under the Ministry of Interior with a predicted total investment of USD 9.99 Million. The project is based on four components

- The first component of this project is Disaster Risk Management and Preparedness (USD 4.89 million). The objective is to support capacity building for emergency response mechanisms through the provision of necessary equipment and the strengthening of disaster risk mitigation;
- The second component concerns the strengthening of the hydro-meteorological services (USD 2.09 million). The objective is for disaster risk managers (including households, farmers and forest managers) to receive more accurate and timely hydro-meteorological forecasts and services in order to undertake more beneficial preparatory measures aimed at limiting the risks posed by weather;
- The third component deals with the development of building codes (USD 0.36 million). The objective is to reduce hazard risks through the development of improved building codes and mechanisms for the introduction of improved standards. The component activities include (a) development of a national building code, (b) training engineers in new design standards and (c) developing a mechanism for the licensing of engineers;
- The fourth component is aimed at catastrophe insurance (USD 2.65 million). Here the main objective is to increase the level of catastrophe insurance coverage among Albanian households and SMEs through the establishment of the SEE Catastrophic Risk Insurance Facility, of which Albania will be a shareholder and member.

Table 7: International and regional cooperation activities of IEWE and MMS

International and regional organization and cooperation mechanisms	IEWE	MMS
WMO	member, PR	no
WMO RAVI	member	no
RMDCN	no	
IOC	Member	
UNISDR	cooperation	no
UNDP	yes	no
EUMETSAT	no	no
ECMWF	no	no
EUMETNET	no	no
METEOALARM	Cooperation started	no
ECOMET	no	no
EUFP7 projects, networks	no	no
EU JRC		no
EU PHARE		no
EUCLID	no	no
EUR-OPA	member	no
EFAS		no
DMSEE	member	no
SEEVCCC		no
SAVA Commission	member	no
NWP consortium		no
NMHS bilateral	Montenegro, Serbia	Italy

It is critical to promote regional and other international cooperation in order to provide the public, the socio-economic sectors and the DRR with some adequate level of services, and to fulfill international commitments and agreements (e.g. WMO) for hydrological measurements and international data sharing, and to implement the law of hydrological services in Albania. Moreover is critical for Albania to strengthen collaboration with neighboring countries, particularly concerning water management and floods as Albania shares a great part of its upstream and downstream water resources with its neighbors.

2.4. Technical recommendations to strengthen NMHS capacities in support of DRR

The Albanian hydro-meteorological sector is more or less disordered with major weaknesses in its institutional and legal framework and if does not have the technical, human and financial resources to meet the needs for hydro-meteorological services to support DRR nationally nor to properly fill its international commitments of producing hydro-meteorological data. The identified gaps in the legal framework and institutional arrangements should be considered as a priority before further development of NMHS capacities to support DRR.

Legal framework and institutional arrangements related to the role of NMHS in DRR

1. There is a need to prescribe a new law for hydrometeorological services in Albania, taking into account, national needs from public and different economic sectors, including Disaster Risk Reduction, regional cooperation and international commitments;
2. There is need to re-organize the national hydrological and meteorological services aiming to be a Public Service according to the WMO standards, and to better promote the national and regional DRR management;
3. The roles and responsibilities of the Hydrometeorological organizations in Albania pertaining to Disaster Risk Reduction should be clearly stated in the new framework for Disaster Risk Reduction under development.

Operational relationships with other agencies

4. There is an urgent need to develop Standard Operating Procedures (SOP) that would clarify the roles and responsibilities and the cooperation mechanisms for the development, the issuance and the dissemination of warning products and services;
5. There is the need to clearly define role and responsibilities of different institutions in floods and drought risk assessment and management, particularly amongst GDCE, MAFCP, MEFW and IEWE.

Monitoring and observations networks and data exchange

6. There is an urgent need to upgrade the Albanian meteorological and hydrological networks to meet the WMO standards and recommendations, and with consideration of the good practices of European NMHS;
7. There is a need to revitalize the network of synoptic, climatological and hydrological stations and gradually develop the network of automatic observations stations;
8. There is an urgent need to upgrade the calibration and maintenance system of the meteorological and hydrological equipment;
9. There is a need to further strengthen the observation network by developing remote sensing systems, including one upper-station, one or two weather radars and a lightning detection system;
10. There is an urgent need to develop real-time communication system for observations and data, including the connection to the WMO GTS.

Forecasting

11. There is an urgent need to develop an operational forecasting system that would issue regularly short-term and medium term forecasts products;

12. There is a need to further develop capacities to support DRR through nowcasting;
13. There is a need to Improve the capacities to use Numerical Weather Prediction (NWP) products;
14. There is a need to develop and integrate additional modelling for hydrology, air quality, and sea-wave and to link these models to NWP;
15. There is a need to improve capacities to use automatic analyzing, editing and dissemination tools;
16. There is a need to improve the technical capacities to develop monthly and seasonal climate outlooks.

Hydrometeorological data management systems

17. There is an urgent need to initiate a data rescue programme to digitize and quality ensure the historical data;
18. There is a need to develop the technical capacities for data management and to adopt automatic quality control systems of hydrometeorological data.

Hazard analysis

19. There is a need to develop hazard analysis and mapping (through GIS tools) based on historical data and climate change projections to support risk assessment;
20. There is a need to acquire capacities and software for meteorological and hydrological analysis, GIS and hydrological modelling.

Information technology and telecommunication issues

21. There is an urgent need to reinstalled the connection to WMO Global Telecommunication System (GTS);
22. There is a need to ensure a data link to the observations sites;
23. There is an urgent need to put into operation a website for public weather service and warning dissemination.

Warning products and services

24. There is an urgent need to establish a 24/7 science based analyzing, forecasting and warning system;
25. There is an urgent need to design and develop meteorological, hydrological and environmental (e.g. air quality) warning products and services (i.e. format, thresholds) in close cooperation with the Disaster Risk Management stakeholders;
26. There is an urgent need to develop Standard Operating Procedures (SOP) that would specify the actions for the development, the issuance and the dissemination of warning products and services under a Quality Management System (QMS) framework.

Climate change analysis

27. There is a need to develop a climate data management system;
28. There is a need to develop the technical capacities for climate change projections downscaling to local scales;
29. There is a need to develop climate change impact studies in cooperation with DRR, industry and other sectors.

Human Resources

30. There is a need to ensure adequate human resources to the hydrometeorological sector to sustain its role towards the community and in different phases of DRR;
31. There is a need to use optimally existing human resources through leveraging all three governmental Meteorological Services capacities;

32. There is a need to strengthen training programmes for the staff of the hydrometeorological sector on products and services related to disaster risk reduction, particularly in forecasting and operational hydrology;
33. There is a need to develop human capacities in telecommunication, data management and information technology to benefit from modern technologies.

Regional cooperation

34. A regional Multi-Hazard Early Warning System composed of inter-operable national Early Warning Systems should be designed through a regional cooperation process. A comprehensive design and planning document should include institutional and technical aspects of MHEWS, as well as a cost-benefit analysis and a fund-raising strategy;
35. Modernization and interoperability of the meteorological and hydrological networks should be implemented at the sub-regional level to benefit from economies of scale and financing opportunities. This plan should include automatic on-line stations, a sub-regional radar network as well as a lightning detection network;
36. In order to improve their forecasting capacities, SEE countries should increase their cooperation with global, regional and specialized Centres (eg ECMWF) producing NWP, by developing their NWP capacities and become members of NWP model consortiums. Linkages between NWP models and hydrological models should also be developed for a better flood forecasting;
37. A regional harmonization of watch and warning systems should be promoted;
38. Cross-border exchanges of real-time data, forecasts and warnings should be increased.

2.5. Recommendations from the Albania National Policy Dialogue

Based on the detailed assessments of the DRR policies and practices as well as the NMHS capacities, gaps and needs in the beneficiaries to support DRR, policy recommendations were developed. Initial results were presented to national stakeholders for review and discussions during National Policy Dialogues organised by WMO together with the UNDP in Tirana the 4-15 July 2010. During this meeting, high-level participants endorsed the assessment, as well as the set of recommendations emanating from it and presented hereunder.

HFA priority 1: Ensure that disaster risk reduction (DRR) is a national and a local priority with a strong institutional basis for implementation

Recommendation 1: To improve and strengthen national and local government mechanisms to institutionalise lessons learned from previous disasters and incorporate them into DRR policy, planning and programming. Previous experiences of disasters and the response to them reveal and good knowledge of the disaster potential across the population and establish addressing disaster risk as a national priority. Capturing these experiences and using them to guide future DRR policy, planning and programming is an important step in ensuring that DRR is evidence-based and builds on the foundations of existing knowledge. Such mechanisms will help to promote and support dialogue, the exchange of information and coordination among relevant agencies and institutions at all levels with the aim of fostering a unified approach towards DRR.

Recommendation 2: To establish a National Platform for Disaster Risk Reduction. To further support the Government of Albania's existing and ongoing programme of disaster risk management, the establishment of a National Platform is proposed to strengthen the profile of DRR and to ensure that debate across all levels of government, technical agencies such as the hydro-meteorological, meteorological and the seismological services, civil society, non-governmental organizations and the private sector is ongoing and contributes actively to policy-making and planning. The National Platform will allow for the engagement of all major practitioners and technical specialists as well as representatives of communities and those affected. It will also promote awareness and coordination among the relevant sectors, and ultimately support the

linking of such awareness and coordination to national planning, budgeting and implementation of DRR activities.

HFA priority 2: Identify, assess and monitor disaster risks and enhance early warning

Recommendation 3: To establish and invest in fully operational 24/7 hydro-meteorological services (technical and human resources) as well as in the seismological sector to support risk assessment and early warning systems and promote operational monitoring, warning, forecasting and mapping of meteorological, hydrological and seismological hazards. This will build on the existing Disaster Risk Assessment and the Vulnerability and Capacity Assessment undertaken with support from the ARC. It is critical to perform comparative analysis of the existing institutional and legislative arrangements for meteorological, hydrological and seismological services, upgrade and modernize hydro-meteorological and seismological observation networks, data management and forecasting systems and provide sustainable organizational, human and technical resources to maintain and operate them. It is also necessary to strengthen the early warning capacity with a multi-hazard approach and enhanced cooperation with the Ministry of Interior, Directorate General for Civil Emergencies and other key stakeholders and the National Civil Emergencies Plan, to include contributions by the hydro-meteorological and seismological services.

Recommendation 4: To create appropriate mechanisms to increase coordination between the three meteorological organizations. With three organizations responsible for delivering meteorological services in Albania (Institute of Environment, Water and Energy (IEWE); Albanian Air Force Meteorological Service (MWFS); and, Tirana International Airport Meteorological Service) there is a need to develop an appropriate framework with the legal basis to ensure that roles and responsibilities in DRR are clearly defined.

Recommendation 5: To integrate policy, planning and programming in adaptation to climate change with DRR strategy. The frequency and magnitude of hydrological and meteorological hazards has the potential to increase due to climate change. It is critical to invest in local scale climate studies in order to promote adaptation to climate change and to ensure that climate change adaptation and DRR are integrated into one programme coordinated through the Directorate for Civil Emergencies and the hydro-meteorological service.

HFA priority 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels

Recommendation 6: To integrate DRR into the education system in Albania at all levels – primary, secondary, university. Building on existing levels of awareness and expanding understanding to incorporate the future threats from climate change and other hazards, as well as new development, it is recommended that the Ministry of Education examines the potential for integrating DRR as a part of national curricula at all levels, particularly in those areas showing the highest levels of risk. In addition, universities and other tertiary education institutions should be encouraged to establish research programmes encompassing different disaster risks, the results of which should have a natural outlet through the National Platform.

Recommendation 7: To establish a National Training Centre for DRR and Civil Protection practitioners and community members, using the existing National Fire Fighting Training Centre as a foundation. The most challenging issue is the building (or, at least, the consolidation) of the culture of safety and resilience. This requires ongoing, continuous activities aimed at increasing community capacities, regular integration of DRR into (particularly local) development plans, training activities and simulation exercises for all levels, and, most importantly, greater potential for creating the potential for the development of the capacity of women as powerful agents of the transmission of the culture of safety and resilience to the younger generation. The establishment of a National Training Centre for DRR would support this ambitious agenda and assist the process of strengthening capacities within the many stakeholders.

Recommendation 8: Supported through bilateral, regional and international cooperation and partnerships, sustainable development, poverty reduction, good governance and disaster risk reduction are mutually compatible objectives and strategies, and in order to meet the challenges ahead, accelerated efforts must be made to mainstream and integrate disaster risk reduction into development and governmental and sectoral strategies. Furthermore, efforts must be made to build the necessary capacities at all levels of institutional organization in Albania to manage and reduce risk. Such harmonization of mutually compatible objectives can help to counter the negative effects of increased population, unsustainable development practices, degradation of natural resources, the increasing exposure of the poor to disaster risks, ineffective forecasting, defective environmental control measures, inadequate capacity development and lack of appropriate market mechanisms, all of which are amplified if disaster risk is not addressed effectively as an integral component of the implementation of development.

Recommendation 9: To support the development of studies and research around the reduction of specific risk factors that affect Albania. Although the major hazards that affect Albania are well known, far less is known about the detailed effects of these hazards, the vulnerabilities that are constructed in the face of these hazards and the capacities that are necessary to address them. Again, through the auspices of the National Platform for DRR, the results of studies and research can be examined and recommended for inclusion in development planning.

HFA priority 4: Reduce the underlying risk factors

Recommendation 10: In the context of reducing overall risks, and with consideration for increasing climate associated, seismic and geological associated risks, to develop national capacities for climate (hydrological and meteorological) and geological (including seismological) services to support medium and long-term sectoral planning, as a critical aspect of disaster risk reduction. Enhanced investments are needed in climate data rescue, climate and geological modelling, forecasting and analysis to support sectoral planning in at-risk sectors. Development of these capacities would require a strong collaboration and coordination across many ministries and with the meteorological, hydrological and geological services, as well as enhanced regional cooperation in this area with other South East European and EU countries.

Recommendation 11: To improve networking with international institutions/institutions present in the region and to promote the increased involvement of such organizations in the strengthening of DRR in Albania. To enhance regional and international cooperation for the purpose of exchanging observation data, knowledge, technology and expertise regarding DRR, to share research findings, lessons learnt and best practice, participation in joint trainings and workshops all of which would contribute to enhancing the ability of Government of Albania to strengthen its DRR programme, raise overall awareness and improve capacity development measures.

HFA priority 5: Strengthen disaster preparedness for effective response at all levels

Recommendation 12: To strengthen disaster preparedness for effective emergency response at all levels and to promote disaster prevention. First, ensure that emergency response plans are targeted to the individual needs of the vulnerable communities, authorities and emergency responders. Second, establish guidelines for systematic development of contingency plans at all levels that are backed by the requisite human, material and funding resources. Lastly, harmonise standard operating procedures governing response to emergencies and standardize terminology and capacity development taking into account roles and responsibilities in emergency response.

Recommendation 13: To strengthen awareness about the importance of preparedness. Promote the engagement of the media in order to stimulate a culture of preparedness and strong community involvement through sustained public education campaigns and public consultations at all levels of society.

Recommendation 14: To increase the involvement of the private sector in activities aimed at DRR with special emphasis placed on insurance companies for the purpose of building on achievements already made in promoting public private partnerships (PPP) to better engage the private sector in DRR activities. This can be done by encouraging the private sector to place greater emphasis on and allocate more resources to pre-disaster activities, such as risk assessments and early warning systems and through the promotion of the development of financial risk-sharing mechanisms, particularly insurance and reinsurance against disasters.

Recommendation 15: To strengthen regional and international links to support more effective fire risk preparedness and prevention. During the last two decades the occurrence of forest fires in Albania and across the region as a whole has increased in number and also in the size of the area affected, the main causes being human negligence and pasture burning. Preparedness to reduce forest fire impacts includes the creation of coordination mechanisms between the forestry administration, local authorities, hydro-meteorological services and the population, as well as civil emergency authorities (particularly fire fighters). Regional cooperation in addressing the fire risk should be strongly promoted as there is an increasing fire risk throughout the region. Existing regional cooperation can serve as a good basis for such developments.

Recommendation 16: To increase the use of simulation exercises (including table-top exercises) as a regular feature of emergency response and preparedness training. Increasing and cumulative experience of disasters allows for the understanding and lessons learned to be used in practising response and preparedness procedures through all types of simulation exercises either in field situations or the classroom.